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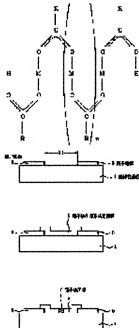
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(54) MANUFACTURE OF ELECTRON EMITTING ELEMENT, AND IMAGE  
FORMING DEVICE



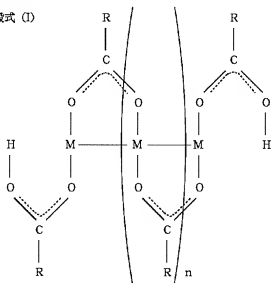
provide an element which has  
y characteristic by growing an  
high polymer film containing  
between facing electrodes, and  
to form an electron emitting part.  
as 5 and 6 are made on the surface  
1 cleaned enough. An organic  
polymer shown by the formula (M is the  
R is alkyl or aryl, and h is an  
electron emitting material is applied  
and 6, and then it is heat-treated  
ion of an electron emitting part.  
between the electrodes 5 and 5, and a  
film 8 for formation of the electron  
electron emitting part 3.

[Claim 1] The manufacture approach of the electron emission component characterized by carrying out heating baking and forming the electron emission section after forming the organometallic compound macromolecule which contains an electron emission ingredient in inter-electrode [ which counters ] inter-electrode [ said ] in the manufacture approach of a surface conduction mold electron emission component of having the electron emission section.

[Claim 2] The manufacture approach of an electron emission component according to claim 1 that said organometallic compound macromolecule is the high molecular weight object of the acetic-acid metal salt shown by the following general formula (I).

[Formula 1]

一般式 (I)



(M shows the metal of platinum group metals among a formula, and, as for R, an alkyl group or an aryl group, and n show an integer.)

[Claim 3] The manufacture approach of an electron emission component according to claim 1 or 2 that said organometallic compound macromolecule is a macromolecule which is made to carry out the polymerization reaction of the organometallic compound which has an unsaturated bond, and is obtained.

[Claim 4] The manufacture approach of an electron emission component according to claim 2 that M is Pd in the high molecular weight object of the acetic-acid metal salt shown by said general formula (I).

[Claim 5] The manufacture approach of the image formation equipment characterized by said electron emission component being manufactured by the approach of a publication by claim 1 thru/or one term of 4 in the manufacture approach of image formation equipment of having the envelope which has an electron emission component and an image formation member inside, and the driving means which controls the exposure to said image formation member of the electron ray emitted from said electron emission component according to an information signal.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] This invention is concerned with a display, a recording device, etc. which are an electron emission component and its application, and relates to the manufacture approach of a surface conduction mold electron emission component, and the manufacture approach of the image formation equipment using the electron emission component especially.

#### [0002]

[Description of the Prior Art] Conventionally, two kinds, the source of a thermoelectron and a cold cathode electron source, are known as an electron emission component. There are a field emission mold (it omits Following FE), a metal / insulating layer / metal mold (it omits Following MIM), a surface conduction mold electron emission component (it may omit Following S C E), etc. in a cold cathode

electron source.

[0003] As an example of FE mold, W.P.Dyke&W.W.Dolan, "Fieldemission", Advance in Electron Physics, The 8th volume, the 89th page (1956) and C.A.Spindt, "Physical properties of thin-film field emission cathodes with molybdenum cones", J.Appl.Phys., the 47th volume, the 5248th page (1976), etc. are known.

[0004] As an example of an MIM mold, C.A.Mead, "The tunnel-emission amplifier", J.Appl.Phys., the 32nd volume, the 646th page (1961), etc. are known.

[0005] There are M.I.Elinson, "Radio Eng.Electron Pys.", 10, etc. as an example of the S C E mold (1965).

[0006] S C E uses the phenomenon which electron emission produces for the thin film of the small area formed on the substrate by passing a current in parallel with a film surface. As this surface conduction mold electron emission component, it is SnO<sub>2</sub> by said M.I.Elinson etc. The thing using a thin film, Thing [G.Dittmer:"Thin Solid Films" by Au thin film, The 9th volume, the 317page(1972)], and In 2O3 / SnO<sub>2</sub> Thing [M.Hartwell depended on a thin film and C.G.Fonstad:"IEEE Trans. ED Conf.", 519(1975)] and thing [depended on a carbon thin film -- Araki \*\* others -- : -- a vacuum, the 26th volume, No. 1, 22-page (1983)], etc. are reported.

[0007] The typical component configuration of these surface conduction mold electron emission component is shown in drawing 14. In this drawing, the thin film with which an insulating substrate, and 5 and 6 contain a component electrode, and, as for 4, 1 contains the electron emission section, and 3 are the electron emission sections.

[0008] Among the thin films 4 containing the electron emission section in this invention, as the electron emission section 3, it consists of a conductive particle whose particle size is dozens of A, and the thin film 4 containing the electron emission sections other than three consists of particle film. In addition, the particle

film described here is film with which two or more particles gathered, and not only the condition that the particle distributed separately but a particle puts mutually the film in contiguity or the condition (island shape is also included) of having overlapped, as the fine structure.

[0009] In addition, the thin film 4 which contains the electron emission section apart from this has the case of the carbon thin film with which the conductive particle was distributed. The surface conduction mold electron emission component which performed said foaming processing impresses an electrical potential difference to the thin film 4 containing the above-mentioned electron emission section, and makes an electron emit from the above-mentioned electron emission section 3 by passing a current on a component front face.

[0010] When the example of the thin film 4 containing the electron emission section is given, Pd, Ru, Ag, Au, Metals, such as Ti, In, Cu, Cr, Fe, Zn, Sn, Ta, W, and Pb, PdO, SnO<sub>2</sub>, In<sub>2</sub>O<sub>3</sub>, PbO, and Sb<sub>2</sub>O<sub>3</sub> etc. -- an oxide -- HfB<sub>2</sub>, ZrB<sub>2</sub>, LaB<sub>6</sub>, CeB<sub>6</sub>, YB<sub>4</sub>, and Gd<sub>2</sub>B<sub>4</sub> etc. -- boride -- They are semi-conductors, such as nitrides, such as carbide, such as TiC, ZrC, HfC, TaC, SiC, and WC, and TiN, ZrN, HfN, and Si, germanium, carbon, AgMg, NiCu, Pb, Sn, etc.

[0011] And the thin film 4 containing the electron emission section is formed by vacuum evaporation technique, a spatter, modified chemical vapor deposition, the distributed applying method, the dipping method, the spinner method, etc.

[0012] Although various approaches as the manufacture approach of an electron emission component of having the electron emission section 3 can be considered, the example is shown in drawing 15. In this drawing, 2 is a thin film for electron emission section formation, for example, the particle film is mentioned.

[0013] Hereafter, explanation of the manufacture approach is explained for order based on drawing 14 and drawing 15 later on.

1) Form a vacuum deposition technique after washing with a detergent, pure water, and an organic solvent, and fully form the component electrodes 5 and 6 for the insulating substrate 1 on the field of this insulating substrate 1 with a photolithography technique ( drawing 15 (a)). Although you may be what kind of thing as long as it has conductivity as an ingredient of a component electrode, a nickel metal is mentioned, for example and the component electrode spacing L1 is [ the thickness d of 300 micrometers and the component electrodes 5 and 6 of 2 micrometers and the component electrode die length W1 ] 1000A.

[0014] 2) Form an organic metal thin film by applying and leaving an organic metal solution on the insulating substrate in which the component electrodes 5 and 6 were formed between the component electrodes 5 and the component electrodes 6 which were prepared on the insulating substrate 1. In addition, an organic metal solution is a solution of the organometallic compound which uses said metals, such as Pd, Ru, Ag, Au, Ti, In, Cu, Cr, Fe, Zn, Sn, Ta, W, and Pb, as the main element.

[0015] Then, heating baking processing of the organic metal thin film is carried out, patterning is carried out by lift off, etching, etc., and the thin film 2 for electron emission section formation is formed ( drawing 15 (b)).

[0016] 3) Then, if the energization processing called foaming is impressed between the component electrode 5 and 6 according to the power source whose electrical potential difference is not illustrated, the electron emission section 3 from which structure changed will be formed in the part of the thin film 2 for electron emission section formation ( drawing 15 (c)).

[0017] The thin film 2 for electron emission section formation is made to break, deform or deteriorate locally by this energization processing, and the part where structure changed is called the electron emission section 3. As explained previously, these people are observing that the electron emission section 3 consists of metal

particles.

[0018]

[Problem(s) to be Solved by the Invention] However, there were the following troubles in the organometallic compound currently used for the raw material of an electron emission ingredient by the above manufacture approaches of the conventional surface conduction mold electron emission component.

(1) It does not become so thick that the thickness of the metallic-oxide thin film obtained after baking in order that an organometallic compound may evaporate in part and may sublime at the time of baking has electrical conductivity required in order to perform foaming processing. So, in the conventional method, the process of spreading → baking of an organometallic compound was performed many times (2 - 3 times), and thickness was thickened.

[0019] (2) In order to crystallize in the case of membrane formation (spreading of an organometallic compound → neglect) of an organometallic compound (condensation), the thickness of the metallic-oxide thin film obtained after baking becomes an ununiformity. under the effect, the component which has the fixed electron emission characteristic was stabilized, and was obtained -- there was nothing.

[0020] This invention is set to the manufacture approach of an electron emission component, as a result of inquiring in view of the above-mentioned trouble. It is what solves the above-mentioned trouble by using the organometallic compound macromolecule which carried out macromolecule quantification of the organometallic compound instead of the conventional organometallic compound which is the raw material of an electron emission ingredient. Prevent sublimation evaporation of the electron emission ingredient which consists of an organometallic compound macromolecule, and crystallization (condensation) of an organic metal is prevented. Spreading of a complex solution → The thickness which has electrical conductivity

required in order to perform foaming processing for the stroke of baking as for 1 time is obtained. It aims at offering the manufacture approach of an electron emission component that it is stabilized and the component which has the still more fixed electron emission characteristic can be obtained, and the manufacture approach of the image formation equipment using the electron emission component.

[0021]

[Means for Solving the Problem] That is, this invention is the manufacture approach of the electron emission component characterized by carrying out heating baking and forming the electron emission section, after forming the organometallic compound macromolecule which contains an electron emission ingredient in inter-electrode [ which counters ] inter-electrode [ said ] in the manufacture approach of a surface conduction mold electron emission component of having the electron emission section.

[0022] Moreover, this invention is the manufacture approach of the image formation equipment characterized by manufacturing said electron emission component by the above-mentioned approach in the manufacture approach of image formation equipment of having the envelope which has an electron emission component and an image formation member inside, and the driving means which controls the exposure to said image formation member of the electron ray emitted from said electron emission component according to an information signal.

[0023]

[Embodiment of the Invention] In the manufacture approach of the electron emission component of this invention, it has the description to use the organometallic compound macromolecule which carried out macromolecule quantification of the organometallic compound instead of the conventional organometallic compound which is the raw material of an electron emission ingredient. By using this

organometallic compound macromolecule, there is an operation which prevents sublimation evaporation of an organometallic compound macromolecule according to increase of the intermolecular force by macromolecule quantification of (1) electron emission ingredient, and prevents crystallization (condensation) of an organic metal by amorphous-ization by macromolecule quantification of (2) electron emission ingredients.

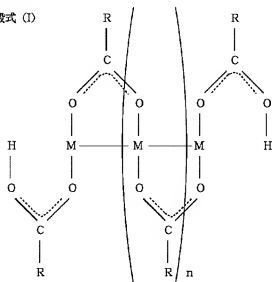
[0024] Therefore, by the manufacture approach of the electron emission component of this invention, the thickness which has electrical conductivity required in order to perform foaming processing for the stroke of spreading → baking of the electron emission ingredient solution applied to inter-electrode as for 1 time is obtained, it is stabilized and the component which has the still more fixed electron emission characteristic can be obtained.

[0025] The organometallic compound macromolecule used in this invention has the desirable high molecular weight object of the acetic-acid metal salt shown by the following general formula (1).

[0026]

[Formula 2]

一般式 (1)



[0027] (Among a formula, an alkyl group or an aryl group, and n of the metal of platinum group metals and R are integers, and M shows 0-5 preferably.)

[0028] In the high molecular weight object of the acetic-acid metal salt shown by the above-mentioned general formula (I), although the metal of platinum group metals is used, Pt and Pd of M are desirable in that etc. Moreover, a polymerization reaction can be carried out and the above-mentioned organometallic compound macromolecule can manufacture the organometallic compound which has an unsaturated bond.

[0029] Next, one embodiment of the manufacture approach of an organometallic compound macromolecule is shown. It flows back until all the nitric acids are consumed in the mixture of the metal black, acetic acid, and nitric acid of platinum group metals (about 17 hours). If an acetic acid is distilled off under reduced pressure except for unreacted palladium by filtration and residue is recrystallized from a dichloromethane-hexane, acetic-acid metallic compounds will be obtained.

[0030] The solution of an acetic-acid metal-screw (alkylamine) or an acetic-acid metal-screw (dialkyl amine) can be obtained by making organic solvents, such as ester and a ketone system, distribute the obtained acetic-acid metallic compounds, and adding twice as many the alkylamine or dialkyl amine of the mol equivalent as acetic-acid metallic compounds into this distributed solution. Metallic compounds can be isolated by what (a solvent is evaporated) this solution is hardened by drying for.

[0031] After heating the isolated metallic compounds at 120-180 degrees C and being in a melting condition, the new metallic compounds of structure as shown in a general formula (I) are obtained by carrying out grade heating maintenance for 5 minutes.

[0032] The new metallic compounds of the structure shown in the general formula (I)

in this invention have structurally high possibility of it being said to be the metallic-compounds macromolecule of the single dimension which has a metal in a principal chain, and having interesting electronic physical properties and an interesting electrical property. Although the electronic ingredient which uses these new metallic compounds as a raw material showed in the example the example which melted further the metallic-compounds macromolecule shown in a new general formula (I), applied in atmospheric air, and was applied as an electron emission component after baking, it may have the electrical property which was not not only in these examples of use but in the conventional ingredient.

[0033]

[Example] The example of reference and an example are given to below, and this invention is concretely explained to it.

[0034] It flows back until all the nitric acids are consumed in example of reference 1 acetic acid, a nitric acid, and the mixture of palladium black (about 17 hours). If an acetic acid is distilled off under reduced pressure except for unreacted palladium by filtration and residue is recrystallized from a dichloromethane-hexane, red microcrystal ( $\text{Pd}_2(\text{OAc})_6$  and  $\text{H}_2\text{O}$  (acetic-acid palladium) will be obtained.

[0035] The butyl-acetate solution of an acetic-acid palladium-screw (dipropyl amine) can be obtained by distributing the obtained acetic-acid palladium in butyl acetate, and adding the twice as many dipropyl amine of the mol equivalent as acetic-acid palladium into this distributed solution. An acetic-acid palladium-screw (dipropyl amine) can be isolated by [ which harden this solution by drying ] carrying out (butyl acetate being evaporated).

[0036] By what (after being in a melting condition, heating maintenance is carried out for 5 minutes) the isolated acetic-acid palladium-screw (dipropyl amine) is heated for at 150 degrees C, the palladium compound of structure as shown in a

general formula (I) can be obtained.

[0037] The following analysis performed structural analysis of the obtained palladium compound.

(1) The infrared absorption spectrum of the palladium compound obtained by infrared-absorption-spectrum measurement drawing 3 and the infrared absorption spectrum of the acetic-acid palladium made into the reference sample at drawing 4 were shown. Drawing 3 shows that the obtained palladium compound has acetic-acid palladium and similar structure. Moreover, the carbonyl group (C=O) of the obtained palladium compound and the neighboring absorption peak which can belong are carrying out the  $50\text{cm}^{-1}$  low wave number shift rather than  $1558\text{cm}^{-1}$  and  $1604\text{cm}^{-1}$  of acetic-acid palladium. This shows that the consistency of the electron which is participating in C=O association of a carbonyl group is low, and suggests possibility that palladium has combined with the oxygen atom of a carbonyl group.

[0038] (2) Nuclear-magnetic-resonance spectrum measurement (1 H-NMR spectrum measurement)

Palladium compound obtained by drawing 5 1 H-NMR spectrum and acetic-acid palladium made into the reference sample at drawing 6 1 H-NMR spectrum was shown. Each obtained spectrum is  $\text{CHCl}_3$  of TMS of a primary standard, and a solvent. If it removes, there has been only one peak detected.

[0039] Drawing 5 shows that the obtained palladium compound has acetic-acid palladium and similar structure. Moreover, the peak which can belong to the methyl group ( $\text{CH}_3$ ) of the obtained palladium compound is carrying out the 0.4 ppm quantity magnetic field shift as compared with 1.55 ppm and 1.95 ppm of acetic-acid palladium. This shows that the electron density of the carbon combined with the methyl group is high, and suggests possibility of having structure which palladium has combined with the organic molecule in acetic-acid palladium further.

[0040] (3) The visible-near-infrared absorption spectrum of the palladium compound obtained by visible-near-infrared absorption spectrum measurement drawing 7 and the visible-near-infrared absorption spectrum of the acetic-acid palladium-screw (JIPUOBIRUAMIN) before heating at 150 degrees C to drawing 8 were shown.

[0041] Drawing 7 shows that the obtained palladium compound has the absorption band to the measurement wavelength field, and the charge in a molecule has delocalized it. This suggests that the smoothness of the O-C-O section combined with the palladium in an organic molecule is high, and possibility that the charge of palladium has delocalized through association of O-C-O is high. Moreover, possibility that association exists between palladium-palladium from the skeletal structure is high.

[0042] (4) The X diffraction pattern of the palladium compound obtained by X diffraction pattern measurement drawing 9, the X diffraction pattern of the acetic-acid palladium-screw (dipropyl amine) before heating at 150 degrees C to drawing 10, and the X diffraction pattern of the acetic-acid palladium made into the reference sample at it at drawing 11 were shown.

[0043] From drawing 9, it is presumed that the structure of the obtained palladium compound has the same structure as an acetic-acid palladium-screw (dipropyl amine) and acetic-acid palladium from a difference hardly being seen among three kinds of compounds which indicated the location of a diffraction peak although the intensity ratios of a diffraction peak differ.

[0044] It is thought that the palladium compound which has structure as shown in a general formula (I) as a conclusion is obtained from the above analysis result.

[0045] By changing the palladium black of the raw material in the example 1 of example of reference 2 reference to platinum black, the platinum compound of structure as shown in a general formula (I) can be obtained. The same analysis as

the example 1 of reference performed structural analysis of the obtained platinum compound.

[0046] Example 1 drawing 1 is the explanatory view showing the configuration of the fundamental electron emission component manufactured by the approach of this invention.

[0047] The electron emission component of the type shown in drawing 1 as an electron emission component of this example was created. Drawing 1 (a) shows the top view of this component, and drawing 1 (b) shows AA line sectional view. Moreover, one shows an insulating substrate among drawing 1, and 3 shows the electron emission section. In addition, in the component electrode spacing of the component electrode 5 and the component electrode 6, and W1, the width of face of a component electrode and d express the thickness of a component electrode, and, as for L1 in drawing, W2 expresses the width of face of a component.

[0048] Drawing 2 is process drawing showing an example of the manufacture approach of the electron emission component of this invention. The creation approach of the electron emission component of this example is described using drawing 2.

[0049] \*\* The component electrodes 5 and 6 which fully consist this of nickel on the 1st page of this insulating substrate after washing with an organic solvent were formed, using a quartz substrate as an insulating substrate 1 (drawing 2 (a)). At this time, the component electrode spacing L1 was set to 3 micrometers, and width of face W1 of a component electrode was made to 500 micrometers, and it made that thickness 1000Å.

[0050] \*\* After applying the acetic-acid palladium macromolecule (inside of formula,  $R=CH_3$ ,  $M=Pd$ ) content solution (chloroform solution) which was obtained in the example 1 of reference and which has structure as shown in a general formula (I),

heat-treatment for 10 minutes was carried out at 300 degrees C, and the particle film which consists of an oxidization palladium (PdO) particle (mean particle diameter: 70A) was formed, and it considered as the thin film 2 for electron emission section formation ( drawing 2 (b)).

[0051] here -- the thin film 2 for electron emission section formation -- the width of face (width of face of a component) W -- 300 micrometers -- carrying out -- the component electrodes 5 and 6 -- it has arranged in the center section mostly.

Moreover, the thickness of this thin film 2 for electron emission section formation is 100A, and sheet resistance is  $5 \times 10^4$ . They were  $\omega/\omega$ . In addition, the particle film described here is film with which two or more particles gathered, the film in the condition (island shape is also included) that adjoined or lapped and not only the condition that the particle distributed separately but the particle met mutually as the fine structure is put, and the particle size means the path about the particle which can recognize particle shape in said condition.

[0052]  $\omega/\omega$  Next, as shown in drawing 2 (c), the electrical potential difference was impressed among the component electrodes 5 and 6, and the electron emission section 3 was formed in carrying out energization processing (foaming processing) of the thin film 2 for electron emission section formation. The sheet resistance of the thin film 2 (before foaming processing) for electron emission section formation obtained by this approach had 5% of variation.

[0053] In the creation approach of the electron emission component of the example 1 of the example 2 above, the polyacrylic acid palladium (polymerization degree 2- dozens) which is made to carry out the polymerization of the acrylic-acid palladium, and is obtained instead of the acetic-acid palladium giant molecule of  $\omega/\omega$  term was used (a solvent is alcohol). The sheet resistance of the thin film 2 (before foaming processing) for electron emission section formation obtained by this approach had

5% of variation.

[0054] In the creation approach of the electron emission component of the example 1 of the example of comparison 1 above, organic palladium (the product made from Okuno Pharmaceuticals, ccp-4230) was used instead of the acetic-acid palladium giant molecule of \*\* term (a solvent is butyl acetate). The sheet resistance of the thin film 2 (before foaming processing) for electron emission (spreading of complex solution -> process of baking was repeated twice) section formation obtained by this approach had 10% of variation.

[0055] The example which produces example 3 image-formation equipment is explained below using drawing 12 and drawing 13 . By the same manufacture approach as an example 1, the bank produced many electron emission components by which flattening was carried out in the shape of Rhine on the insulating substrate 41. Next, after fixing this insulating substrate 41 on the rear plate 42, the modulating electrode 46 which has the electronic passage hole 45 above the insulating substrate 41 has been arranged in the direction which intersects perpendicularly with the component electrode 43 of an electron emission component.

[0056] Furthermore, the face plate 50 (a fluorescent screen 48 and the metal back 49 are formed and constituted by the inside of a glass substrate 47) has been arranged through a housing 51 to 5mm upper part of the insulating substrate 41, frit glass was applied to the joint of a face plate 50, a housing 51, and the rear plate 42, and it sealed by calcinating 10 minutes or more at 400 degrees C thru/or 500 degrees C in atmospheric air or nitrogen-gas-atmosphere mind (refer to drawing 12 ).

[0057] Moreover, frit glass also performed immobilization of the insulating substrate 41 to the rear plate 42. In drawing 12 , 44 is the electron emission section.

[0058] Although the envelope 52 was constituted from a face plate 50, a housing 51,

and a rear plate 42 like \*\*\*\* at this example, since, it is prepared in order to mainly reinforce the reinforcement of the insulating substrate 41, when it has reinforcement sufficient by insulating substrate 41 the very thing, the rear plate 42 of the rear plate 42 of another object is unnecessary, seals a housing 51 directly in the insulating substrate 41, and may constitute an envelope 52 from a face plate 50, a housing 51, and an insulating substrate 41.

[0059] In the case of monochrome, it consists only of a fluorescent substance, but in the case of the fluorescent screen of a color, a fluorescent screen 48 consists of the black \*\*\*\* material 53 and fluorescent substances 54 which are called a black stripe or a black matrix by the array of a fluorescent substance (refer to drawing 13).

[0060] The purposes in which a black stripe and a black matrix are prepared are it not being conspicuous and carrying out color mixture etc. by distinguishing by different color between each fluorescent substance 54 of the three-primary-colors fluorescent substance which is needed in the case of color display with, and making the section black, and controlling the fall of the contrast by the outdoor daylight reflection in a fluorescent screen 48. In this example, the fluorescent substance adopted the stripe configuration, formed the black stripe previously, applied each color fluorescent substance to the gap section, and produced the fluorescent screen 48. Although the ingredient which uses as a principal component the graphite used usually well is used as an ingredient of a black stripe, there is conductivity, and if transparency and reflection of light are few ingredients, it will not restrict to this.

[0061] Although settling and print processes were used, as for the case of monochrome, slurry method was used for the approach of applying a fluorescent substance to a glass substrate 47 by this example which is a color. Even if it uses print processes also in the case of a color, the equivalent spreading film is obtained.

[0062] Moreover, the metal back 49 is usually formed in the inside side of a fluorescent screen 48. The metal back's purpose is protection of the fluorescent substance from the damage by the collision of the anion generated within acting as an electrode for impressing improving brightness and electron beam acceleration voltage and an envelope etc. by carrying out specular reflection of the light by the side of an inside to a face plate 50 side among luminescence of a fluorescent substance.

[0063] The metal back performed data smoothing (usually called filming) of the inside side front face of a fluorescent screen after fluorescent screen production, and it produced by carrying out vacuum deposition of the aluminum after that.

[0064] In order to raise the conductivity of a fluorescent screen 48 to a face plate 50 further, a transparent electrode (un-illustrating) may be prepared in the external surface side of a fluorescent screen 48, but since conductivity just with the metal back sufficient in this example was acquired, it omitted.

[0065] When performing the above-mentioned sealing, in the case of the color, sufficient alignment was performed in order to have to make each color fluorescent substance and an electron emission component correspond.

[0066] After exhausting the ambient atmosphere in the glassware completed as mentioned above with the vacuum pump through the exhaust pipe (un-illustrating) and reaching sufficient degree of vacuum, through the container outer edge child Dx1 Dxm and Dy1 thru/or Dyn, the electrical potential difference was impressed between the component electrodes 43, the above-mentioned foaming was performed, the electron emission section 44 was formed, and the electron emission component was produced.

[0067] With the degree of vacuum of abbreviation  $1 \times 10^{-6}$  torr extent, it welded by heating a non-illustrated exhaust pipe with a gas burner, and the closure of an

envelope was performed at it.

[0068] Getter processing is performed in order to maintain the degree of vacuum after the closure finally. This is processing which heats the getter arranged at the position in an image display device (un-illustrating), and forms the vacuum evaporatio film by the heating methods, such as resistance heating or high-frequency heating, after the closure, just before performing the closure. Ba etc. is usually a principal component and a getter maintains a degree of vacuum by the absorption of this vacuum evaporatio film.

[0069] In the image formation equipment concerning this invention completed as mentioned above for each electron emission component By impressing an electrical potential difference through the container outer edge child Dx1 Dx<sub>m</sub> and Dy1 thru/or Dyn Electron emission is carried out, after the emitted electron passes the electronic passage hole 45 of a modulating electrode 46, it collides with a fluorescent screen 48 and it is made to be accelerated through a secondary terminal Hv with the high pressure of several kV or more impressed to the metal back 49 or a transparent electrode (un-illustrating), and to excite and emit light. Image display of the electron beam which passes the electronic passage hole 45 is controlled and carried out by impressing the electrical potential difference according to an information signal to a modulating electrode 46 through the container outer edge child G1 thru/or Gn in that case.

[0070] At this example, when 6kV was impressed as acceleration voltage by arranging the modulating electrode 46 which has the electronic passage hole 45 of the diameter of 50 micrometer in 10-micrometer upper part of the insulating substrate 41 through SiO<sub>2</sub> (un-illustrating) which is an insulating layer, ON and OFF of an electron beam have been controlled by the modulation electrical potential difference within 50V.

[0071] The configuration described above is an outline configuration required when producing an image display device, for example, detailed parts, such as an ingredient of each part material, are not restricted to the above-mentioned contents, and they are suitably chosen so that it may be suitable for the application of an image display device.

[0072] Moreover, although this example showed the image display device which used the modulating electrode for applying the electron emission component of this invention to an image display device, as long as it is the configuration of making the electron from the electron emission component of this invention colliding with a fluorescent substance, what kind of equipment may be used. Moreover, in addition to this, the electron emission component of this invention can be applied to (electron ray EB) drawing equipment and a recording device.

[0073]

[Effect of the Invention] It is effective in the thickness which has electrical conductivity required as explained above, in order to perform foaming processing for the process of spreading → baking of a complex solution as for 1 time by using an organometallic compound macromolecule as a raw material of an electron emission ingredient in the manufacture approach of an electron emission component according to this invention being obtained, and being stabilized and being able to obtain the component which has the still more fixed electron emission characteristic.

[0074] Since a production process is simplified by the above thing and a percent defective is also reduced, the manufacturing cost of an electron emission component can be lowered. Moreover, according to the manufacture approach of the image formation equipment of this invention, the image formation equipment with which a good image is obtained can be offered by using the homogeneous high electron emission component which has the fixed electron emission characteristic as

an electron source.